



# Pregnancy with Hypothyroid Secondary to Treatment of Thyroid Carcinoma: A Case Report



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## ABSTRACT

**Background:** Thyroid malignancy is one of the most common malignancies in women of reproductive age. One of the normal physiological change in pregnancy is an increase in total maternal thyroid levels. According to 2015 DATIN information, the prevalence of hypothyroidism in women of reproductive age was 2.2%. Method of delivery in patients with thyroid disorders are mostly by cesarean section due to complications of the mother and/or fetus. Fetal outcome usually associated with low birth weight and poor APGAR Score.

**Objective:** Reporting a case of pregnancy with hypothyroidism secondary to thyroid carcinoma treatment

**Case Presentation:** 37-year-old woman Gravida 3 Parity 2 Abortion 0 with 18 weeks pregnancy after thyroid ablation treatment with a history of Papillary Thyroid Carcinoma – Follicular Variant, following a complete thyroidectomy in August 2016. The patient was given 6-dose ablation therapy, the last therapy was performed in April 2019. On clinical examination, the patient have no sign and symptoms suggesting hypothyroidism. On laboratory examination, the thyroid stimulating hormone (TSH) level was increased. Levothyroxine dosage was adjusted until the patient in euthyroid status in the early 3rd trimester of pregnancy until the delivery period. The fetal examination suggests that the Bio-Physical Profile was normal according to gestational age. The patient underwent vaginal delivery following 38 weeks of gestation with good maternal outcomes and low birth weight neonatal outcomes, no thyroid nodules, and slightly increased thyroid function.

**Conclusion:** Management of counselling about preconception, contraception, and initial screening of patients with a history of thyroid carcinoma are the initial steps to help a better outcome in pregnancies with thyroid disorders.

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## 1. Introduction

Thyroid Disorders is a metabolic disease with the second highest incidence rate after Diabetes Mellitus in Indonesia. According to information from DATIN (Centre for Data and Information of the Indonesian Ministry of Health) in 2015, the prevalence of hypothyroidism in women of reproductive age was 2.2%.<sup>1</sup> Thyroid Carcinoma subtype Follicular Variant Papillary Carcinoma is a case that is more common in women of reproductive age.<sup>2</sup> One of the changes in the normal physiology of pregnancy is slightly increased amount of maternal thyroid levels. The method of delivery in patients with thyroid disorders are mostly by caesarean

section due to complications of the mother and/or fetus. Fetal outcome usually associated with low birth weight and poor APGAR Score.

In this case, we present a case of pregnancy with a history of thyroid carcinoma who had completed radio-nuclear treatment 3 months before conception with a hypothyroid state during pregnancy. The baby was conceived naturally, had a full-term pregnancy and undergone vaginal delivery with good maternal outcomes and low birth weight baby, good APGAR Score, and no signs of congenital hypothyroidism.

## 2. Case Presentation

A 37 years old female, Gravida 3 Parity 2 Abortion 0, working as a housewife, was found 18 weeks pregnant 3 months after sixth thyroid ablation at the time of examination. The patient had a history of Papillary Thyroid Carcinoma Follicular Variant type of thyroid carcinoma and a complete thyroidectomy performed in August 2016. The patient was then given ablation therapy 6 times until April 2019. At 3 months of preconception, high thyroid stimulating hormone (TSH) levels reached 150 mIU/L. (Fig. 1) Patients routinely consumed levothyroxine 50 mg once a day and calcium bicarbonate 500 mg three times a day by prescriptions from an oncologist. In the course of pregnancy, Thyroid Stimulating Hormone (TSH) increases so that the levothyroxine dose was adjusted 100 mg at 26 weeks of gestation until the patient was in euthyroid status in the early 3rd trimester of pregnancy to the time of delivery. (Fig. 2)

On physical examination, the general findings was good, no complaints of fatigue, normal vital signs, hair loss, dry skin, nodules on the neck, nor significant weight gain that was more than normal in pregnancy. The blood laboratory test results are normal, where the TSH value varies as stated below (Fig. 1 and Fig. 2)

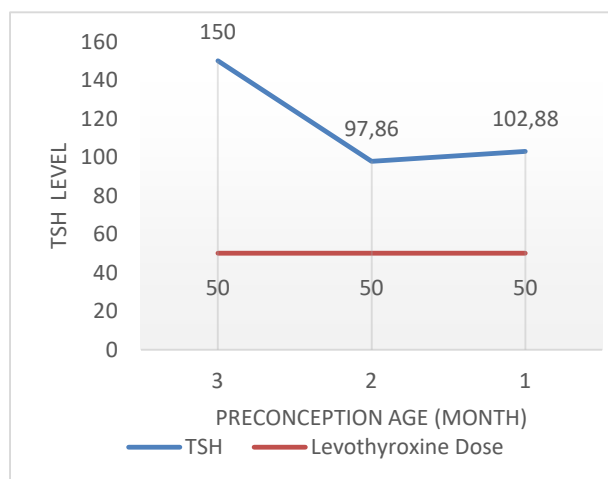


Figure 1. The results of the TSH level examination from the timeframe carried out the last ablation (April 2019) until before conception.

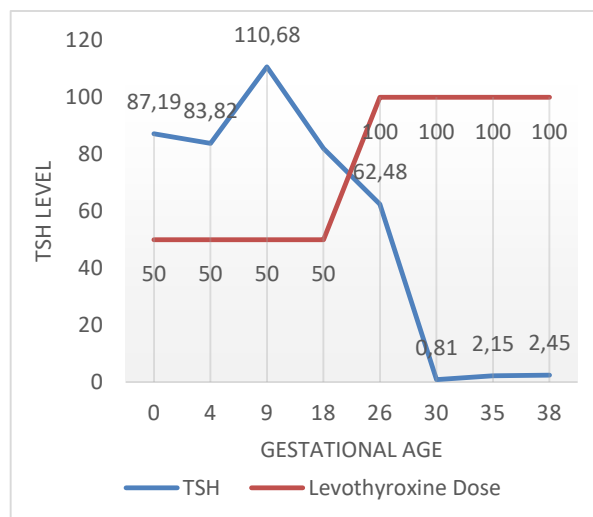


Figure 2. TSH levels from the beginning of conception (July 2019) to the end of pregnancy (May 2020)

During the Antenatal Care Visit (ANC) at 18 weeks of gestation, the results of the ultrasound examination showed normal fetal growth in accordance with the gestational age with an estimated fetal weight of 237 grams, the amount of amniotic fluid with a Maximal Vertical Pocket of 3.47 cm, normal placenta implantation and no fetal abnormalities were to be seen.

During the antenatal visit at 26 weeks' gestation, the results of the fetal growth ultrasound examination were consistent with gestational age with estimated weight of 751.44 grams. No fetal abnormalities were seen on the tests performed.

On 14 June 2020 the patient presented at 38 weeks of gestation with timely contractions and was planned for vaginal delivery. The following day, patient gave birth spontaneously to a baby boy weighed 2455 grams, with favourable APGAR score of 9-10-10. On the physical examination of the newborn, there was no nodule on the neck, with the impression of a vigorous baby. During their treatment at the hospital, the neonates receive exclusive breastfeeding and was screened for thyroid levels on the third day following birth, with a high TSH result of 8.58 (normal value: 0.51-4.94) and Free T4 (FT4) 25.63 (normal value: 10.6 - 19.4).

## 3. Discussion

In early pregnancy, thyroid hormone increases in the presence of oestrogen stimulation, thereby increasing the distribution of thyroid hormones in the form of Free T3 (FT3) and FT4 which can cross the placental blood barrier, while TSH from the mother does not penetrate the placental barrier, so the measurement of TSH in the mother is a one of the

accurate measurement methods during pregnancy. Meanwhile, during pregnancy, because the TSH receptors in the body compete with the alpha subunit of HCG, the normal reference level during pregnancy tends to be lower than non-pregnant state. Normal TSH levels in non-pregnant women are 0.3-4.3, whereas at the time of pregnancy, the normal values in 1st Trimester is 0.1-2.5, 2nd Trimester is 0.2-3.0, and in 3rd Trimester is 0.3-3.0.<sup>2,3</sup>

Hypothyroidism can be divided into 2 classifications, clinical hypothyroidism and subclinical hypothyroidism. Clinical hypothyroidism is defined as a deficiency in thyroid hormone, diagnosed by high TSH levels accompanied by low FT4 with significant clinical symptoms in the patient.

Pregnancy with hypothyroidism can have several effects on the mother and fetus, including the increased risk of miscarriage, preeclampsia or gestational hypertension, anemia, prematurity, and an increased incidence of postpartum morbidity and mortality such as postpartum hemorrhage, and thyroid dysfunction over a long period of time. The effect on the fetus is that it can inhibit development and growth as well as neurocognitive decline in children.<sup>4,5</sup> Adequate iodine intake and maternal T3 T4 levels are the main determinants of the equilibrium state of thyroid development in the fetus.<sup>6</sup>

This case reported the condition of a hypothyroid mother in the preconception period until the end of the second trimester of pregnancy. This is expressed by the high level of TSHs = 150.0, where the normal threshold for non-pregnant women is 4.3. This situation is secondary to the operative treatment of thyroid malignancy and iodine ablation as the management of malignant cases of thyroid carcinoma thus causing hypothyroid state despite hormone replacement therapy with levothyroxine. In spite of having no plans to conceive again, patient had never been counselled for contraceptive use at the time of operative treatment and during ablation therapy. Patients regularly visit the Nuclear Medicine Clinic for ablation therapy and TSH and calcium levels are monitored monthly. Patients received iodine ablation therapy according to the NCCN (National Comprehensive Cancer Network) are advised to postpone pregnancy for approximately 6 months after the last ablation therapy and to conduct preconception counselling to confirm thyroid status before pregnancy.<sup>5,7</sup> This is based on several studies that have proven that the hypothyroidism of the mother from the time of conception to the early trimester of pregnancy will impact vastly on fetal development process, thus also contributing to

mental and cognitive development of the baby after birth.

According to Sreelatha S et al. in mothers with hypothyroidism, there were 1.9% cases of infants with low birth weight, 9.4% cases of infants with hyperbilirubinemia and 14.6% of infants admitted to the Neonatal Intensive Care Unit (NICU). It was found that normal TSH levels were found in almost all infants, only 4 cases of hyperthyroidism where only one patient suffered from anemia and oligohydramion.

According to Sima Nazarpour et al. the long-term effects of clinical hypothyroidism on cognitive function are well documented, with children born to mothers with clinical hypothyroidism showing developmental disorders.

There was an increase in FT4 in newborns up to 12 weeks of age and began to decline until finally reached normal limits in over 12 weeks of age. FT4 levels were also found to be slightly increased in male babies than in female babies. The fetal outcome in this case a male infant with low birth weight, 2455 grams, with inconclusive laboratory conditions. The new-born still showed inconclusive state from laboratory results of high TSH 8.58 (normal values: 0.51–4.94) and FT4 25.63 (normal values: 10.6–19.4). This is possible because there are still FT3 and FT4 from the mother who were present in fetal blood. The determination of hypo and hyper-thyroid status in neonates was carried out after 14 days of birth where it was assumed that there was no more thyroid hormone from the mother's body in the new-born. No congenital thyroid abnormalities was found in the new-born and maybe is still possible for the baby to reach normal thyroid hormone levels at the age of more than 14 days, but it could not be concluded yet for the growth and development of the baby until the first 2 years of his life.

#### 4. Conclusion

Management of preconception counselling, contraception, and initial screening of patients with a history of thyroid carcinoma are the first steps in helping the outcome in pregnancies with thyroid disorders. Hormone replacement therapy that was carried out early and adjusted periodically in hypothyroid cases helps to optimize fetal outcomes.

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